WHAT IS CLAIMED IS:

1. An objective employed for use with light energy having a wavelength in a range of approximately 266 to 1000 nanometers, comprising:

a focusing lens group comprising at least one focusing lens configured to receive said light energy and form focused light energy;

a field lens oriented to receive focused light energy from said focusing lens group and provide intermediate light energy; and

a Mangin mirror arrangement positioned to receive the intermediate light energy from the field lens and form controlled light energy;

wherein each focusing lens has a diameter of less than approximately 100 millimeters and a maximum corrected field size of approximately 0.15mm.

2. The objective of claim 1, wherein said objective provides a relative bandwidth in excess of 0.5 in the presence of said light energy having a wavelength in the range of approximately 266 to 1000 nanometers.

3. The objective of claim 1, said Mangin mirror arrangement comprising:

a first lens/mirror element having substantially curved concave surfaces and a second surface reflection; and

a second lens/mirror element having minimally curved surfaces and a second surface reflection.

4. The objective of claim 1, configured to have a numerical aperture of approximately 0.9.

5. The objective of claim 1, wherein each lens in the focusing lens group and the field lens each has a diameter of less than approximately 25 millimeters.

6. The objective of claim 1, wherein all lenses are constructed of a single glass material.

7. The objective of claim 1, wherein said objective, including the field lens, the focusing lens group, and the Mangin mirror arrangement comprises no more than seven elements.

8. The objective of claim 7, wherein maximum optical path error from a 10 micron decenter of any from a group comprising the field lens and any lens from the focusing lens group is less than approximately 0.10 microns.

9. The objective of claim 7, wherein maximum optical path error from a 10 micron decenter in the Mangin mirror arrangement is approximately 0.065 microns.

10. The objective of claim 1, said objective comprising no more than nine elements.

11. The objective of claim 10, wherein maximum optical path error from a 10 micron decenter of any lens employed within the objective is less than approximately 0.10 microns.

12. The objective of claim 11, where the maximum optical path error from a 10 micron decenter in the Mangin mirror arrangement is approximately 0.065 microns.

13. The objective of claim 6, wherein the single glass material is fused silica

14. The objective of claim 6, wherein the single glass material is calcium fluoride

15. The objective of claim 2, wherein corrected bandwidth is less than approximately 0.9 with a center wavelength of 633nm.

16. The objective of claim 2, wherein corrected bandwidth is less than approximately 0.07 with a center wavelength of 196nm.

17. The objective of claim 1, wherein said objective is formed from a plurality of glass materials.

18. The objective of claim 17, wherein the plurality of glass materials comprise fused silica and calcium fluoride.

19. The objective of claim 1, wherein said objective is employed with a microscope having a flange, wherein the flange may be located approximately 45 millimeters from a specimen.

20. The objective of claim 1, wherein said objective is employed with a microscope having a flange, wherein the flange may be located approximately 100 millimeters from the specimen.

21. The objective of claim 1, wherein said focusing lens group comprises less than four focusing lenses.

22. The objective of claim 1, wherein said focusing lens group comprises less than six focusing lenses.

23. The objective of claim 1, wherein said field lens forms an intermediate image between said field lens and said Mangin mirror arrangement.

24. An objective employed for use with light energy having a wavelength in the range of approximately 157 nanometers through the infrared light range, comprising:

a focusing lens group configured to receive said light energy and comprising at least one focusing lens, wherein each focusing lens in the focusing lens group has diameter less than approximately 100 millimeters;

at least one field lens oriented to receive focused light energy from said focusing lens group and provide intermediate light energy, each field lens having diameter less than approximately 100 millimeters; and

a Mangin mirror arrangement positioned to receive the intermediate light energy from the field lens and form controlled light energy, said Mangin mirror arrangement imparting the controlled light energy to a specimen with a numerical aperture in excess of 0.65 and a field size of approximately 0.15mm.

25. The objective of claim 24, wherein said objective provides a relative bandwidth in excess of 0.5 in the presence of said light energy having a wavelength in the range of approximately 157 nanometers through the infrared light range.

26. The objective of claim 24, said Mangin mirror arrangement comprising:

a first lens/mirror element having substantially curved concave surfaces and a second surface reflection; and

a second lens/mirror element having minimally curved surfaces and a second surface reflection.

27. The objective of claim 26, wherein each lens in the objective has a diameter of less than approximately 25 millimeters.

28. The objective of claim 24, wherein all lenses are constructed of a single glass material.

29. The objective of claim 24, wherein said objective has at most seven elements.

30. The objective of claim 27, wherein maximum optical path error from a 10 micron decenter of a single lens in the objective is less than approximately 0.10 microns.

31. The objective of claim 24, wherein maximum optical path error from a 10 micron decenter in the catadioptric group is 0.065 microns.

32. The objective of claim 24, wherein said objective comprises less than nine elements.

33. The objective of claim 32 where the maximum optical path error from a 10 micron decenter of any lens in the objective is less than approximately 0.10 microns.

34. The objective of claim 32, wherein maximum optical path error from a 10 micron decenter in the Mangin mirror arrangement is 0.065 microns.

35. The objective of claim 32, wherein all lenses in the objective are constructed of a single glass material.

36. The objective of claim 35, wherein the single glass material is fused silica

37. The objective of claim 35, wherein the single glass material is calcium fluoride

38. The objective of claim 24, wherein corrected bandwidth for the objective is less than approximately 0.9 with a center wavelength of approximately 633nm.

39. The objective of claim 24, wherein corrected bandwidth is less than approximately 0.07 with a center wavelength of 196nm.

40. The objective of claim 24, wherein said objective may be located in a flange within a microscope, said flange positioned no more than approximately 45 millimeters from a specimen during normal operation.

41. The objective of claim 24, wherein said objective may be located in a flange within a microscope, said flange positioned no more than approximately 100 millimeters from a specimen during normal operation.

42. The objective of claim 31, wherein the objective has a numerical aperture in excess of approximately 0.9.

43. An objective constructed of a single glass material for use with light energy having a wavelength in the range of approximately 157 nanometers through the infrared light range, comprising:

at least one focusing lens having diameter less than approximately 100 millimeters receiving said light energy and transmitting focused light energy;

at least one field lens having diameter less than approximately 100 millimeters, receiving said focused

light energy and transmitting intermediate light energy; and

at least one Mangin mirror element having diameter less than 100 millimeters receiving said intermediate light energy and providing controlled light energy through an immersion substance to a specimen.

44. The objective of claim 43, wherein said objective has a field size of approximately 0.15mm.

45. The objective of claim 43, configured to have a numerical aperture of approximately 1.2.

46. The objective of claim 43, wherein each lens used in the objective has a diameter of less than approximately 25 millimeters.

47. The objective of claim 43, said objective used with a microscope having a flange, wherein the flange may be located at least approximately 45 millimeters from the specimen during normal operation.

48. The objective of claim 47, wherein the flange may be located at least approximately 100 millimeters from the specimen during normal operation.

49. The objective of claim 43, wherein only two glass materials are used.

50. The objective of claim 43, wherein the immersion substance is water.

51. The objective of claim 43, wherein the immersion substance is oil.

52. The objective of claim 43, wherein the immersion substance is silicone gel.

53. The objective of claim 43, wherein the objective is optimized to produce minimum spherical

aberration, axial color, and chromatic variation of aberrations.

54. The objective of claim 43, wherein the at least one mangin mirror element is optimized to produce spherical, axial color, and chromatic variation of aberrations to compensate for aberrations induced by the focusing lens group.

55. An objective constructed of a single glass material for use with light energy having a wavelength in the range of approximately 157 nanometers through the infrared light range, comprising:

at least one focusing lens having diameter less than approximately 100 millimeters receiving said light energy and transmitting focused light energy;

at least one field lens having diameter less than approximately 100 millimeters, receiving said focused light energy and transmitting intermediate light energy; and

at least one Mangin mirror element having diameter less than 100 millimeters receiving said intermediate light energy and providing controlled light energy through an immersion substance to a specimen.

56. The objective of claim 55, wherein said objective has a field size of approximately 0.15mm.

57. The objective of claim 55, wherein said at least one Mangin mirror element comprises:

a single lens/mirror element comprising:

a substantially curved concave surface; and

a second minimally curved surface;

wherein both surfaces of the single lens/mirror element are reflective with small central apertures through which light energy may pass.

58. The objective of claim 55, said objective having a numerical aperture of greater than approximately 1.0 at the specimen.

59. The objective of claim 55, wherein each lens in the objective has a diameter of less than approximately 25 millimeters.

60. The objective of claim 55, said objective having an ability to be employed with a microscope having a flange, wherein the flange may be located less than no more than approximately 45 millimeters from the specimen during normal operation.

61. The objective of claim 55, said objective employing no more than two glass materials.

62. The objective of claim 61, wherein the no more than two glass materials comprise fused silica and calcium fluoride.

63. The objective of claim 55, wherein the immersion substance comprises one from a group comprising water, oil, and silicone gel.

64. The objective of claim 55, configured to have a numerical aperture of approximately 1.2.

65. A method for inspecting a specimen, comprising:

providing light energy having a wavelength in the range of approximately 157 nanometers through the infrared light range;

focusing said light energy using at least one lens into focused light energy, where each lens used

in said focusing has diameter less than approximately 100 millimeters;

receiving said focused light energy and converting said focused light energy into intermediate light energy; and

receiving said intermediate light energy and providing controlled light energy through an immersion substance to a specimen.

66. The method of claim 65, wherein said method results in a field size of approximately 0.15mm.